A system for turbo machinery blade vibration has been developed that combines time-of-arrival sensors for blade vibration amplitude measurement and radar sensors for vibration frequency and mode identification. The enabling technology for this continuous blade monitoring system is the radar sensor, which provides a continuous time series of blade displacement over a portion of a revolution. This allows the data reduction algorithms to directly calculate the blade vibration frequency and to correctly identify the active modes of vibration.

The work in this project represents a significant enhancement in the mode identification and stress calculation accuracy in non-contacting stress measurement system (NSMS) technology when compared to time-of-arrival measurements alone.